LANTRONIX®

MatchPort® b/g Pro Integration Guide

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Disclaimer and Revisions

Operation of this equipment in a residential area is likely to cause interference to other devices, in which case the user, at his or her own expense, will be required to take whatever measures may be required to correct the interference.

Note: *This product has been designed to comply with the limits for a Class B digital device pursuant to Part 15 of FCC and EN55022:1998 Rules when properly enclosed and grounded. These limits are designed to provide reasonable protection against radio interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with this guide, may cause interference to radio communications.*

Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device.

Note: *With the purchase of MatchPort b/g Pro, the OEM agrees to an OEM firmware license agreement that grants the OEM a non-exclusive, royalty-free firmware license to use and distribute the binary firmware image provided, only to the extent necessary to use the MatchPort b/g Pro hardware. For further details, please see the MatchPort b/g Pro OEM firmware license agreement.*

Disclaimer

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device is intended only for OEM Integrators. The OEM integrator should be aware of the following important issues.

Labeling of the End Product

The label on the end product incorporating the MatchPort b/g pro module must clearly state that it contains an FCC-approved RF module. For example, "This product contains an RF transmitter FCC ID: R68MPBGPRO and IC: 3867A-MPBGPRO."

RSS-GEN Sections 7.1.4 and 7.1.5 Statement for Devices with Detachable Antennas

This device has been designed to operate with the antennas listed in the Certificate, and having a maximum gain of 5 dBi. Antennas not included in this list or having a gain greater than 5 dBi are strictly prohibited for use with this device, unless system-level FCC approval is gained. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

Integration Note

a) This module is authorized under limited module approval specified to mobile host equipment. So, the antenna must be installed such that 20cm is maintained between the antenna and users.

b) The transmitter module may not be co-located with any other transmitter or antenna.

As long as the two conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing their end product for any additional compliance requirements required with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

Note: *In the event that these conditions cannot be met (for example certain laptop configurations, general purpose PCMCIA or similar cards, or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product (including the transmitter) and obtaining a separate FCC authorization.*

Note: *Changes or modifications to this device not explicitly approved by Lantronix will void the user's authority to operate this device*.

Revision Table

Date	Rev.	Comments
April 2008	A	Initial Release
December 2011	B	Updated absolute maximum ratings and recommended supply voltage information.

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1: Introduction

About the Integration Guide

This guide provides the information needed to integrate the MatchPort b/g Pro™ device server within another product. The intended audiences are the engineers responsible for integrating the MatchPort b/g Pro into their product.

Additional Documentation

The following guides are available on the product CD and the Lantronix Web site (www.lantronix.com)

MatchPort b/g Pro User Guide	Provides information needed to configure, use, and update the MatchPort b/g Pro firmware.
MatchPort b/g Pro Command Reference	Lists and explains MatchPort b/g Pro command line and XML commands.
MatchPort Demonstration Kit Quick Start Guide	Provides information needed to configure, use, and update the MatchPort demonstration kit.

2: Description and Specifications

The MatchPort b/g Pro embedded device server is a complete network-enabling solution on a 1.75"x1.75" PCB. This miniature device server empowers original equipment manufacturers (OEMs) to go to market quickly and easily with networking and web page serving capabilities built into their products.

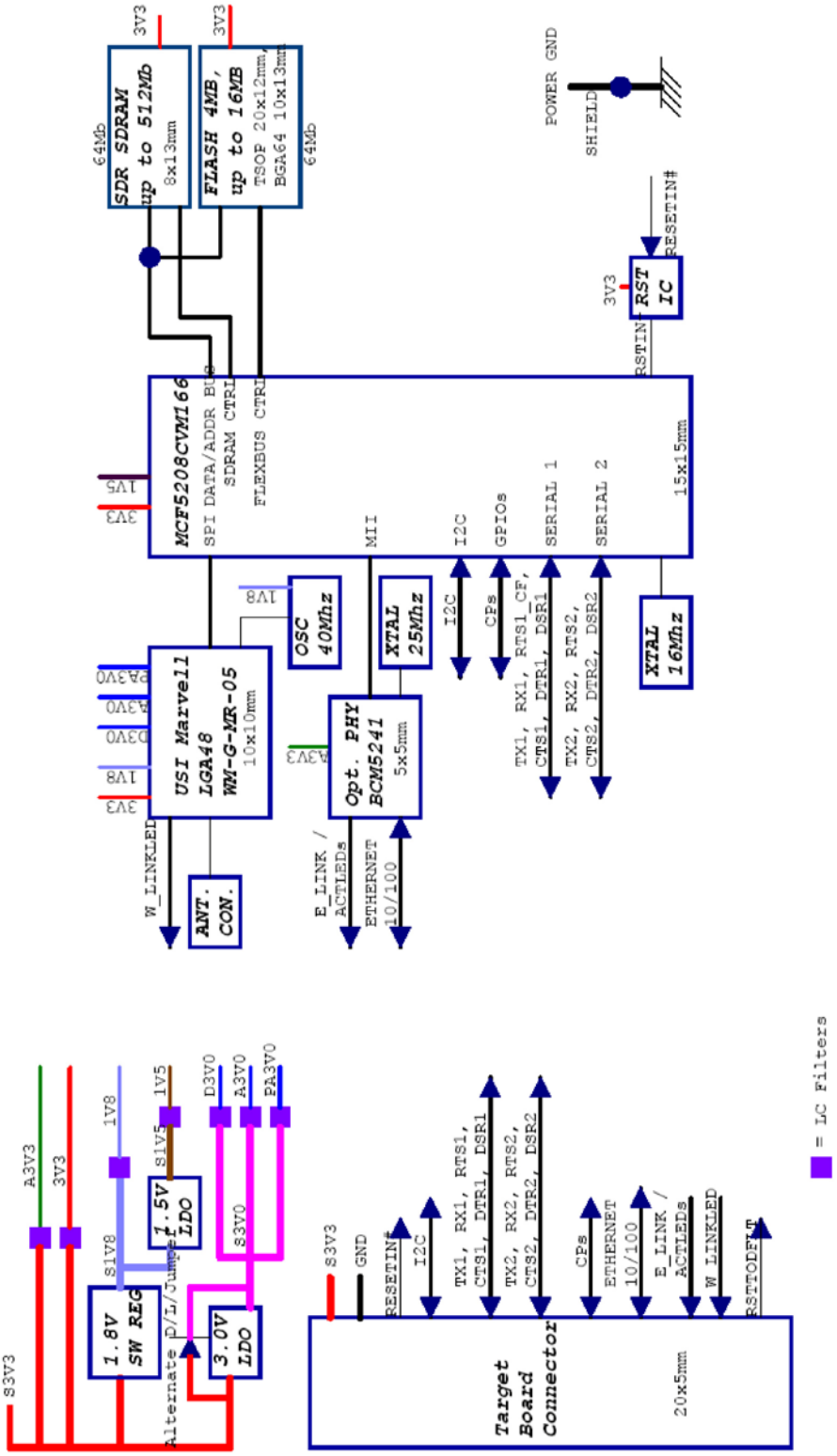
The MatchPort b/g Pro has the following features:

- **Power Supply:** Single regulated 3.3V input required. On board step down conversion. LC filtering to minimize noises and emissions on all supply lines.
- **Controller:** A Lantronix DSTni-FX 32-bit microprocessor, running at 166 MHz internal bus and 83 MHz external bus.
- **Memory:** 64 Mbits Flash and 64 Mbits SDRAM.
- **Wireless LAN:** 802.11bg compliant radio with U.FL connector for external antenna. 802.11i and 802.1X security standards supported.
- **Ethernet:** 10/100 Base TX with auto-negotiation and HP auto-MDIX. On- board 100-ohm terminations included. External RJ45 jack and 1:1 Ethernet magnetics with a minimal numbers of discrete components required.
- **Network interface status indication:** On board WLAN and Ethernet LED drivers.
- **Serial Ports:** Two full duplex serial ports with hardware flow control and modem control handshaking signals. Standard or customized baud rates up to 230 Kbps. External level shifters for RS232. Port 1 can also be configured to drive RS422 or RS485 level shifters.
- **Configurable IO Pins (CPs):** Up to 7 pins are configurable as general purpose I/Os.
- **Interface Signals:** 3.3V-level interface signals.
- **Temperature Range:** Operates over an extended temperature range.

MatchPort b/g Pro Block Diagram

The following drawing is a block diagram of the MatchPort b/g Pro showing the relationships of the components.

Figure 2-1. MatchPort b/g Pro Block Diagram



MatchPort b/g Pro Pinouts

There are two headers of 1x20, 2-mm pin spacing. The odd row header is designated as P1; pins are numbered 1 to 39. The even row header is designated as P2; pins are numbered 2 to 40.

PIN #	NAME	Dir	Active level	FUNCTION
P1.1	RESETIN#	I	Low	Reset. Leave floating if not used.
P1.3	RSTTODFLT	I	Low	Reset to Defaults
P1.5	TX1	O		Transmit Data, port 1
P1.7	RTS1	O		Request to Send, port 1
P1.9	RX1	I		Receive Data, port 1
P1.11	CTS1	I		Clear to Send, port 1
P1.13	CP1	IO		IO Configurable Pin 1
P1.15	CP2	IO		IO Configurable Pin 2
P1.17	CP3	IO		IO Configurable Pin 3
P1.19	CP4	IO		IO Configurable Pin 4
P1.21	TX2	O		Transmit Data, port 2
P1.23	RTS2	O		Request to Send, port 2
P1.25	RX2	I		Receive Data input , port 2
P1.27	CTS2	I		Clear to Send input , port 2
P1.29	CP5	IO		IO Configurable Pin 5
P1.31	CP6	IO		IO Configurable Pin 6
P1.33	CP7	IO		IO Configurable Pin 7
P1.35	RSVD			Reserved. Do not connect
P1.37	S3.3V	I		3.3V Power Input
P1.39	GND	I		Ground

PIN #	NAME	Dir	Active level	FUNCTION
P2.2	GND	I		Ground
P2.4	RSVD			Reserved. Do not connect
P2.6	ETX+	O		PHY's Differential Ethernet Transmit Data +
P2.8	ETX-	O		PHY's Differential Ethernet Transmit Data -
P2.10	ETCT			Differential Ethernet Transmit Data Center Tap
P2.12	ERCT			Differential Ethernet Receive Data Center Tap
P2.14	ERX+	I		PHY's Differential Ethernet Receive Data +
P2.16	ERX-	I		PHY's Differential Ethernet Receive Data -
P2.18	E_LINKLED	O	Low	Ethernet Link LED.
P2.20	E_ACTLED	O	Low	Ethernet Activity LED.
P2.22	W_LINKLED	O	Low	Wireless LAN Link/Activity LED. Active low
P2.24	BOOTP_EN#	IO	Low	Network Boot and Boot Loader Enable.
P2.26	RSVD			Reserved. Do not connect
P2.28	RSVD			Reserved. Do not connect
P2.30	RSVD			Reserved. Do not connect
P2.32	RSVD			Reserved. Do not connect
P2.34	RSVD			Reserved. Do not connect
P2.36	RSVD			Reserved. Do not connect
P2.38	RSVD			Reserved. Do not connect
P2.40	RSVD			Reserved. Do not connect

Power and Ground

The MatchPort b/g Pro requires a regulated 3.3Vdc +/- 5% power input at P1.37 and ground at pin P1.39.

Note: *To minimize noises as well as voltage drops at the connection,* We recommend direct connection of 3.3V and ground on the MatchPort b/g Pro to 3.3V power and ground planes of the target board in place of heavy trace routing.

Reset

The MatchPort b/g Pro reset pin RESETIN# is an input-only pin and connects to an 811-type reset IC. This input is for a pushbutton switch type manual reset. If no external reset control is desired, leave this pin floating.

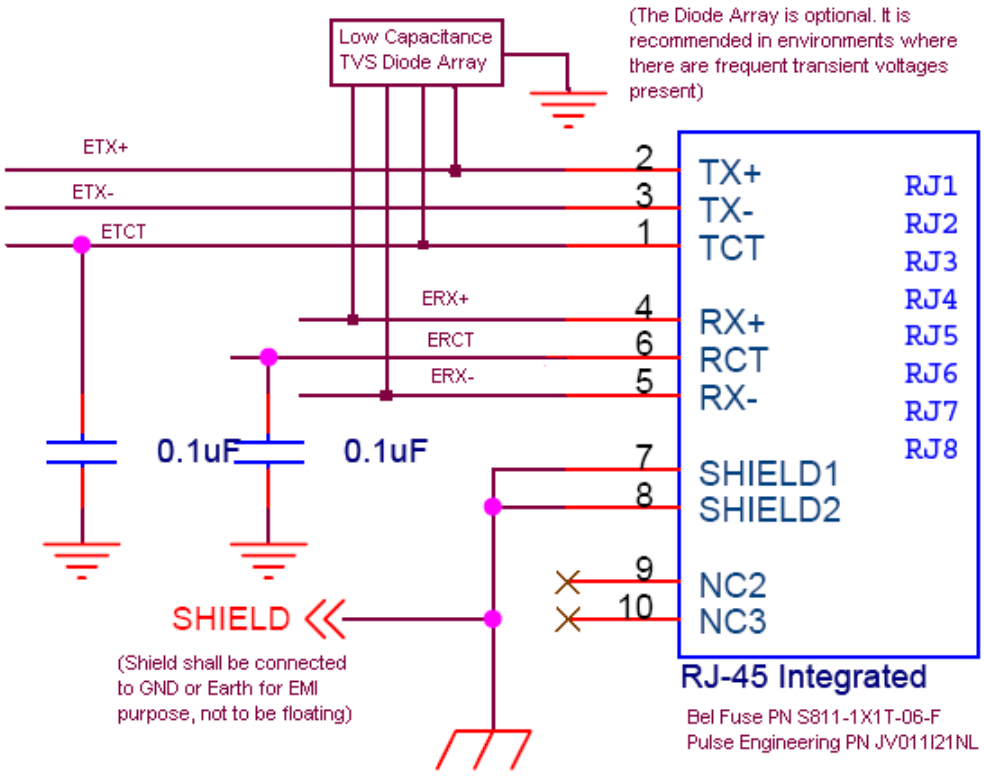
Minimum reset pulse is 2 ms.

There is an on board capacitor, 0.1uF to ground, at the RESETIN# to filter out transient voltages. However, it is a good practice to have RESETIN# trace on the target board as short as possible to avoid reset occurrences when transient voltages such as those caused by ESD are present.

Ethernet Connections

The MatchPort b/g Pro provides Ethernet interface transmit ETX and receive data ERX connections from a PHY device. Thus, before presenting signals to the outside world using an RJ45 jack, a 1:1 Ethernet Magnetics is needed to interface and to isolate the unit. A recommended connection diagram to an RJ45 jack with integrated 1:1 Ethernet magnetics is shown below.

Figure 2-2. Connection Diagram to an RJ45 Jack

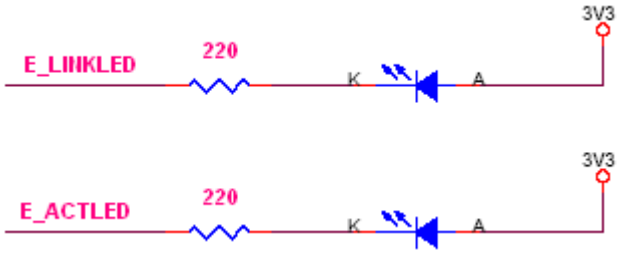


We recommend a low capacitance TVS diode array such as a Semtech SRV05-4 at ETX+, ETX-, ERX+, ERX- if frequent transient voltages are present.

Ethernet LED Connections

The E_LINKLED and E_ACTLED signals are driven by the PHY. They are active low. Recommended connections on the target board are shown below.

Figure 2-3. Recommended LED Connections



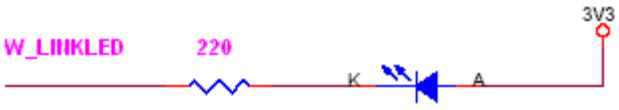
Warning: ***The MatchPort b/g Pro has two 4.7K pull-ups on the E_LINKLED and E_ACTLED signals to set up the PHY's LED Indicator Mode as Ethernet Link and Activities at Power On Reset (POR). Do not connect these two signals with any pull-down resistors as they may corrupt the logic level on these two signals at POR, causing undesired operation.***

Wireless LED Connections

The W_LINKLED is driven by the Radio Module. Active low. Open drain. 10mA max. Recommended connections on the target board are shown below.

The LED is activated when either the receiver or transmitter is active. With WLAN power management disabled, the receiver is always active when the transmitter is not and thus the LED always on when WLAN is the enabled interface. With WLAN power management enabled, receiver and transmitter are turned on selectively and thus the LED flickers.

Figure 2-4. Recommended LED Connections



Antenna Mating Connector

An antenna connection is made via the U.FL style connector on the MatchPort. Lantronix offers two cable options, reverse-SMA to U.FL (P/N 500-180-R) or U.FL to U.FL (P/N 500-181-R).

Figure 2-5. Reverse-SMA to U.FL (P/N 500-180-R)

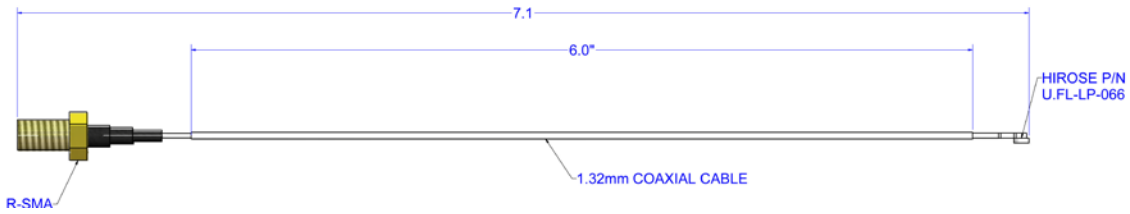
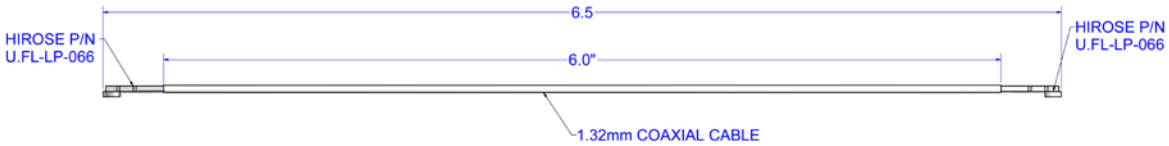
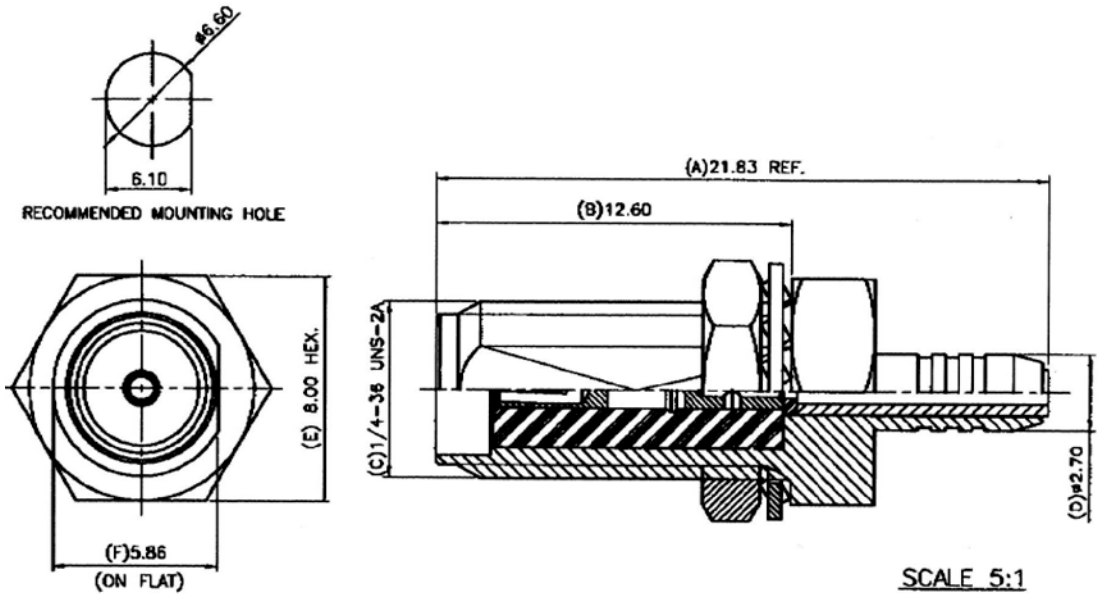


Figure 2-6. U.FL to U.FL Cable (P/N 500-181-R)



Note: *The antenna cable is included in the MatchPort b/g Pro sample. For production, it can be purchased from Lantronix or a cable supplier.*

Figure 2-7. R-SMA Antenna Connector Dimensions (not to scale)



Antenna

The MatchPort b/g Pro has been FCC certified with a 5-dBi gain antenna for wireless 802.11b/g. It is for applications with antennas of equal gain or less. The following are two of the recommended antennas with 2.15-dBi gain and a link to their vendor. They are available from Lantronix as well.

- Wanshih WSS003 (Lantronix part number 930-029-R)
- Wanshih WSS002 (Lantronix part number 930-033-R)

www.wanshih.com

Serial Input/Output

The unit has two RS232 compatible serial ports supporting data rates up to 230 Kbps. They include dedicated RTS and CTS hardware flow control signals. Configurable Pins can be configured to function as DTR and/or DCD.

Serial Port 1 can also be configured for RS422/485. RTS is used as TX enable. Configurable Pins can be configured to function as RS232/RS485 driver selection control and/or half/full duplex driver selection.

The serial module interface employs 3.3V CMOS logic levels, requiring external level shifters for full RS232/485/422 compliance The MatchPort Demo Board includes these line drivers and DTE style DB9 connectors.

Table 2-1. RS232 Connections

MatchPort b/g Pro		DCE Connector			DTE Connector		
Signal (Logic)	**Description**	**DB9**	**DB25**	**Signal**	**DB9**	**DB25**	**Signal**
RXD1	Data In	2	3	RXD1	3	2	TXD1
TXD1	Data Out	3	2	TXD1	2	3	RXD1
RTS1	H/W Flow Control Output	7	4	RTS1	8	5	CTS1
CTS1	H/W Flow Control Input	8	5	CTS1	7	4	RTS1
CPx	Modem Control Input	1	8	DCD	4	20	DTR
CPy	Modem Control Output	4	20	DTR	1	8	DCD

Note: *CPx and CPy are any of the available CPs.*

Table 2-2. JP6 RS422/485 Connections on Demo board

MatchPort b/g Pro Signal (logic)	Description	RS485 Signal	JP6 Pin	DB25 4 Wire	DB25 2 Wire	DB9 4 wire	DB9 2 wire
TXD1	Data Out	TX+485	4	14	14	7	7
TXD1	Data Out	TX-485	3	15	15	3	3
RXD1	Data In	RX+485	2	21	14	2	7
RXD1	Data In	RX-485	1	22	15	8	3
RTS1	TX Enable						
CP3	RS485 Select						
CP4	RS485 2-wire						

Sample Layouts for RS485 Connectivity

Figure 2-8. Combined RS232/422 Transceiver

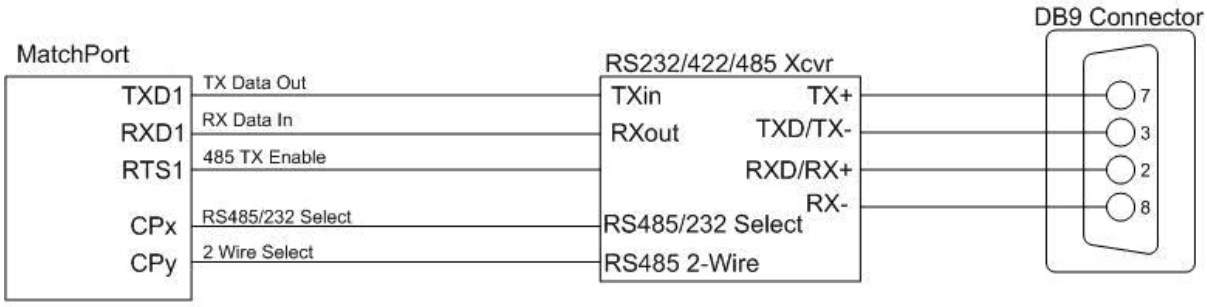


Figure 2-9. Separate RS232/422 Transceivers

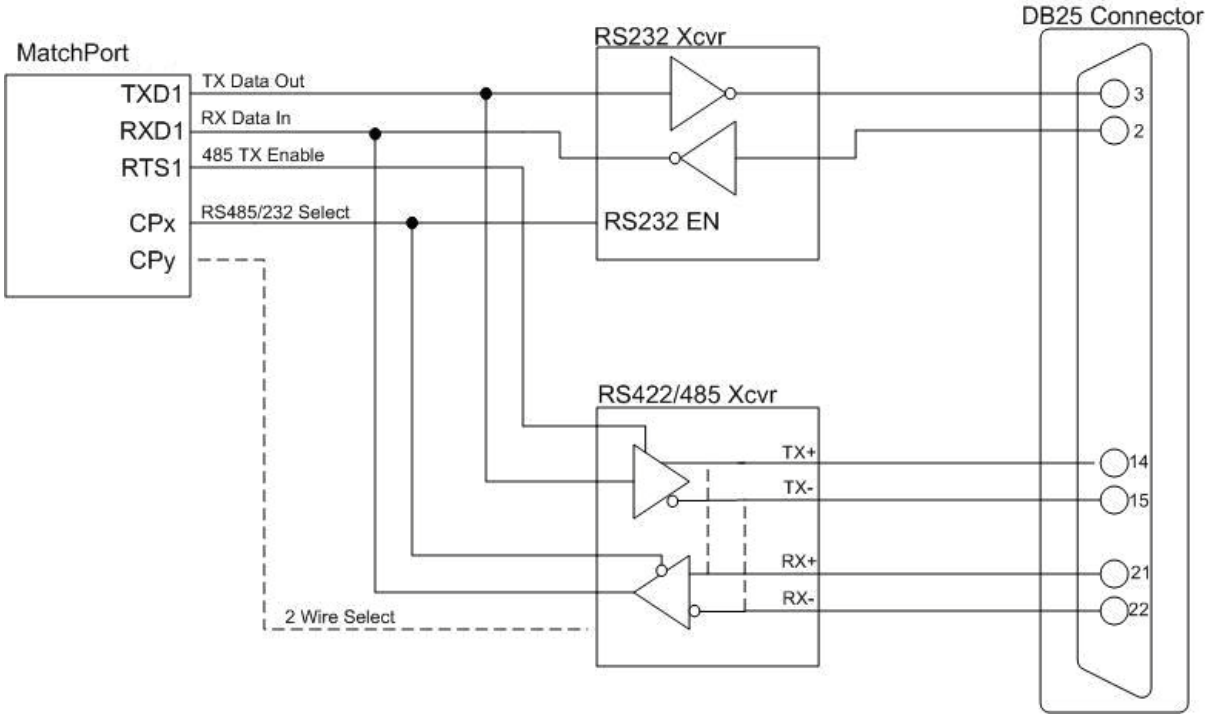
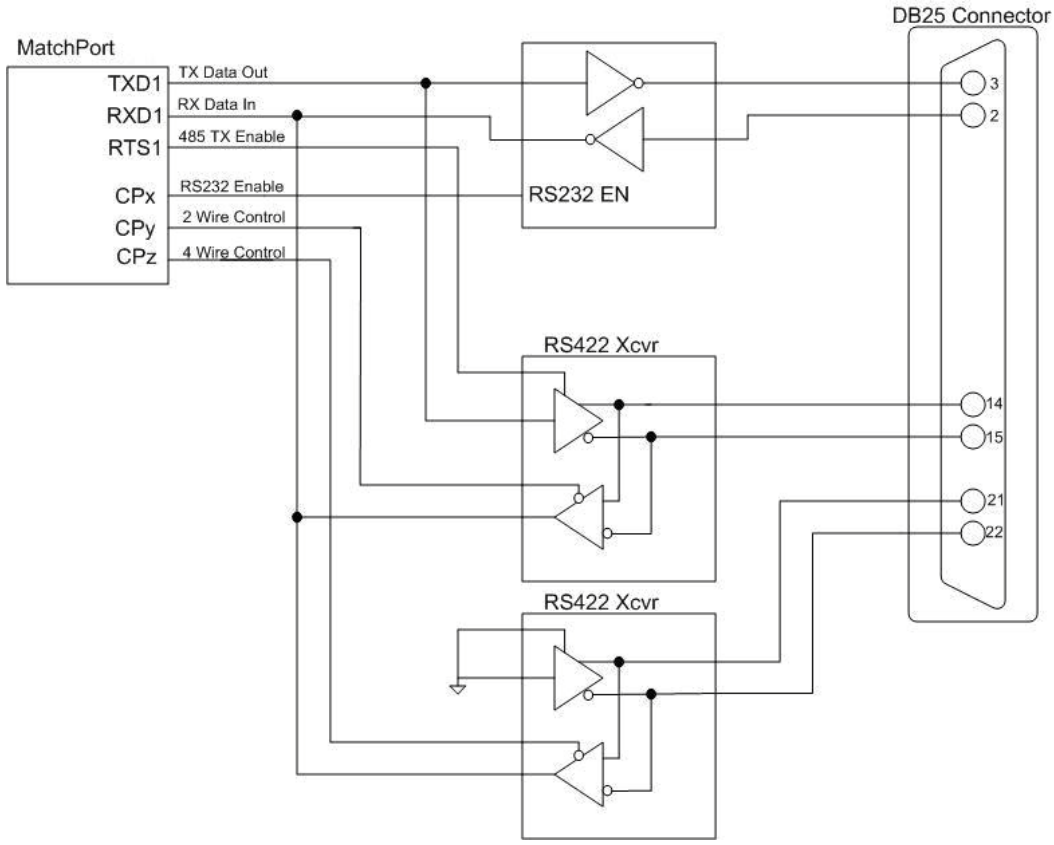


Figure 2-10. Separate RS422 Transceivers for 2-Wire and 4-Wire Setups



To protect the MatchPort b/g Pro and circuitry on the target board against ESD at serial ports, the selected transceiver(s) should have RS232/422/485 bus-pin ESD protection (typically around 15 KV) either on-chip or by external diode arrays.

IO Configurable Pins (CPs)

There are up to seven CPs if no DTR or DCD is used on the serial ports. All CPs have internal pull-up resistors, but the value differs. See table.

CPs can be configured for special functions, like DTR, DCD, RS232/RS485 selection or as general purpose Input or Output (pollable/controllable via CLI or Web Manager). For more information see the User Guide.

PIN #	NAME	FUNCTION
P1.13	CP1	IO Configurable Pin 1
P1.15	CP2	IO Configurable Pin 2
P1.17	CP3	IO Configurable Pin 3
P1.19	CP4	IO Configurable Pin 4
P1.29	CP5	IO Configurable Pin 5
P1.31	CP6	IO Configurable Pin 6
P1.33	CP7	IO Configurable Pin 7

BOOTP_EN#

The BOOTP_EN# pin performs two functions simultaneously. It drives an optional external diagnostics LED to indicate the status of the bootloader. It also serves as input to enable booting from the network when no valid FW image is found in FLASH.

BOOTP enable

Holding BOOTP_EN# low (via switch or jumper) during and up to 10 seconds after a reset allows booting the device with a FW image on a TFTP server only in case no valid image is present on FLASH.

The MatchPort b/g Pro will issue a BOOTP request to acquire an IP address for itself, the IP address of a TFTP server, and the filename of the FW image on the TFTP server. Then it will fetch that file via TFTP, verify, and execute it.

Diagnostics LED

After supplying power to the unit or pressing and releasing the reset button, the diagnostics LED turns on and stays on while the bootloader is running and does not encounter any errors. After the bootloader loads firmware from serial, network or FLASH, it turns off the LED right before handing over execution.

In case an error occurs during the bootloader operation, it will flash the LED. The pattern will be pause, X * long flashes, Y * short flashes, pause, X long flashes, etc.

X is the first digit of the error number and Y the second.

Following are the currently implemented errors:

INVALID_BOOTLOADER_CHECKSUM	11
NO_FLASH_IMAGE_FOUND	12
BAD_FLASH_IMAGE_FOUND	13
BAD_COMMAND_PARAMETER	14
NO_BOOTP_RESPONSE	15
BAD_BOOTP_RESPONSE	16
NO_BOOTP_TFTP_IMAGE	17
RECEPTION_TIMEOUT	18
RECEPTION_OVERRUN	19
IMAGE_OVERSIZE	21
BAD_IMAGE_CHECKSUM	22
BAD_IMAGE_DESTINATION	23
INTERNAL_CODING_PROBLEM	24

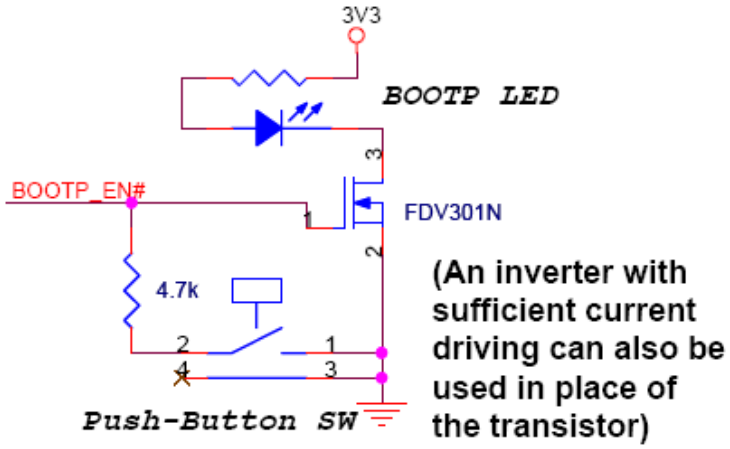
Pin Connection Options

The circuit below is an example on how to correctly connect a switch (or permanent jumper) and an LED to the BOOTP_EN# pin. The customer has the option of implementing either the switch/resistor or the driver/LED or both or none.

The switch can be replaced by a jumper or hardwire. Having the hardwire in place means that if the firmware image in FLASH becomes corrupt, the MatchPort b/g Pro will automatically send out BOOTP requests over the network. This could be a security risk. The switch or jumper allows BOOTP requests to be sent only after manual intervention.

If no switch/jumper/hardwire is installed, network recovery is only possible by issuing a `!NL` command over the serial port.

Figure 2-11. BOOTP_EN# APPLICATION CIRCUIT



BOOTP_EN# application circuit

Electrical Specifications

***Caution:* Stressing the device above the rating listed in this table may cause permanent damage to the MatchPort b/g Pro. Exposure to Absolute Maximum Rating conditions for extended periods may affect the MatchPort b/g Pro's reliability.**

Table 2-3. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Supply Voltage	V_{CC}	3.135	3.6	Vdc
CP Voltage	V_{CP}	-0.3	V_{CC} +0.05	Vdc
Ethernet ETX+, ETX-, ERX+, ERX- Voltage	V_{ETH}	0	V_{CC} +0.3	Vdc
Operating Temperature		-40	70	°C
Storage Temperature		-40	85	°C

Table 2-4. Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Units
Supply Voltage	V_{CC}	3.135	3.3	3.45	Vdc
Supply Voltage Ripples	V_{CC_PP}			2	%
Supply Current _ Power Management enabled	I_{CC}		245		mA
Supply Current _ Power Management disabled			260		mA
Supply Current (Peak)			350		mA
Supply Reset Threshold	V_{RST}	2.85	2.93	3.00	Vdc
CP Pull-ups, except CP5	R_{PU}		100		Kohm
CP5 Pull-up	R_{PU}		20		Kohm
CP, RX, CTS, BOOTP_EN# Input Low Voltage	V_{CP_IL}			0.8	Vdc
CP, RX, CTS, BOOTP_EN# Input High Voltage	V_{CP_IH}	2			Vdc (see note below)
CP, TX, RTS Output Low Voltage (I_{OL} = 4 mA)	V_{CP_OL}			0.4	Vdc
CP, TX, RTS Output High Voltage (I_{OH} = -4 mA)	V_{CP_OH}	V_{CC} - 0.4			Vdc (see note below)

Parameter	Symbol	Min	Typical	Max	Units
E_LINKLED, E_ACTLED Current Drive (sink)	I_{ELED}		12		mA (see note below)
W_LINKLED			10		mA

Notes:

- Do not connect a pull-down resistor on E_LINKLED and E_ACTLED.
- All pins are not 5V-tolerant.

Wireless Specifications

Refer to the following table for the MatchPort b/g Pro's wireless specifications:

Table 2-5. Wireless Specifications

Category		IEEE 802.11b/g
Frequency Range		**2.400 – 2.484 GHz**
Output Power		14 +2.0/- 1.5 dBm 1, 2, 5.5, 11 Mbps 12 +/- 1.5 dBm 6, 9, ≥ 12 Mbps
Antenna Connector		RF, U-FL TYPE HIROSE PN = U_FL-R-SMT-10
Data Rates		1,2,5.5,11,6,9,12,18,24,36,48,54 Mbps
Radio	Number of Selectable Subchannels	US 1-11 CA 1-11 JP 1-14 FR 10-13 SP 10-11 OT 1-13 (OT=Others)
	Modulation	DSSS,DBPSK,DQPSK,CCK, OFDM, 16QAM, 64QAM
Security		WEP, WPA, WPA2/802.11i, EAP-TLS, EAP-TTLS, PEAP, LEAP
Maximum Receive Level		-10 dBm (with PER < 8%)
Receiver Sensitivity		-69 dBm for 54 Mbps -88 dBm for 11 Mbps -85 dBm for 6 Mbps -91 dBm for 1.0 Mbps
W_LINKLED Current		Max 10 mA

Technical Specifications

Table 2-6. Specifications

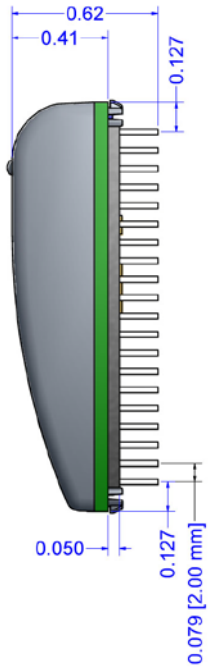
Category	MatchPort b/g Pro
CPU	Lantronix DSTni-FX 32-bit Microprocessor, 166 MHz internal bus, 83 MHz external bus
Memory	64 Mbits Flash and 64 Mbits SDRAM
Firmware	Upgradeable via TFTP, FTP, and the Web
Configuration Pins	Up to 7 pins if no DTR or DCD is used on serial ports.
Reset Circuit	RESETIN# is low active and push-button type. Minimum RESETIN# pulse width is 2 ms at IIL = -500 µA. Reset is also triggered if 3.3V at pin P1.37 drops below 2.93V typically.
Serial Interface	CMOS (Asynchronous) 3.3V - level signals Speed software selectable and customizable (300 bps to 230400 bps)
Serial Line Formats	7 or 8 data bits, 1-2 Stop bits, Parity: odd, even, none
Modem Control	DTR, DCD using CPs

Category	MatchPort b/g Pro
Flow Control	XON/XOFF (software), CTS/RTS (hardware), none
Network Interfaces	Ethernet 10/100 base TX with Auto Negotiation, and HP Auto MDIX
	IEEE802.11bg, with IEEE802.11i/PSK/EAP security.
Protocols Supported	ARP, UDP, TCP, Telnet, ICMP, SNMP, DHCP, BOOTP,, HTTP, HTTPS, SMTP, TFTP, FTP, SSL/TLS, SSH, LPD, PPP, Syslog, DNS, RSS, XML
Management	Internal web server, SNMP Serial login, Telnet login (SSH optional), DeviceInstaller utility,
Internal Web Server	Serves web pages. Either from built in web manager or custom pages in onboard FLASH filesystem.
Custom storage	FLASH filesystem with 2.5 MB capacity
Security	Password protection, locking features
Average Power Consumption (at 3.3V)	0.35 W with Radio and CPU Power Management enabled 0.9 W with Radio and CPU Power Management disabled
Weight	1 oz (28 g)
Cover Material	ABS
Temperature	Operating range: -40°C to +70°C (-40°F to +158°F) Storage range: -40°C to +85°C (-40°F to 185°F)
Warranty	2-year limited warranty
Included Software	Windows™ 98/NT/2000/XP-based Device Installer configuration software and Windows™-based Com Port Redirector and Secure Com Port Redirector, DeviceInstaller, and Web-Manager.

Dimensions

The MatchPort b/g Pro dimensions are shown in the following diagrams:

Figure 2-12. Side Views



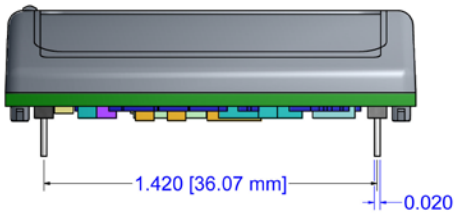


Figure 2-13. Top View

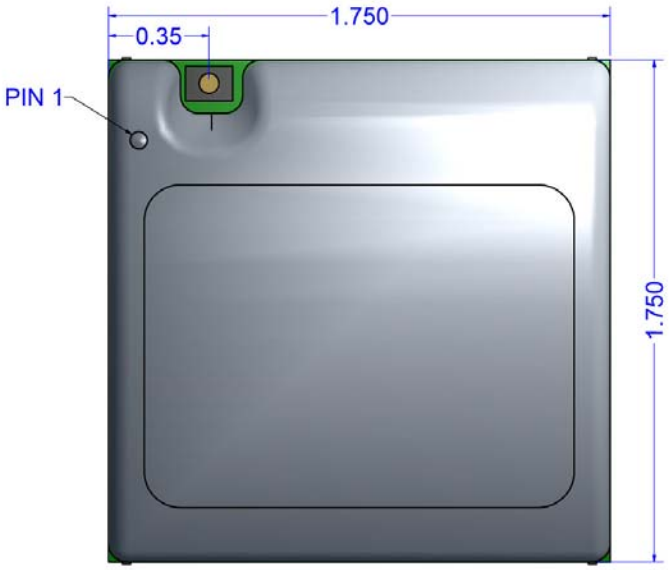
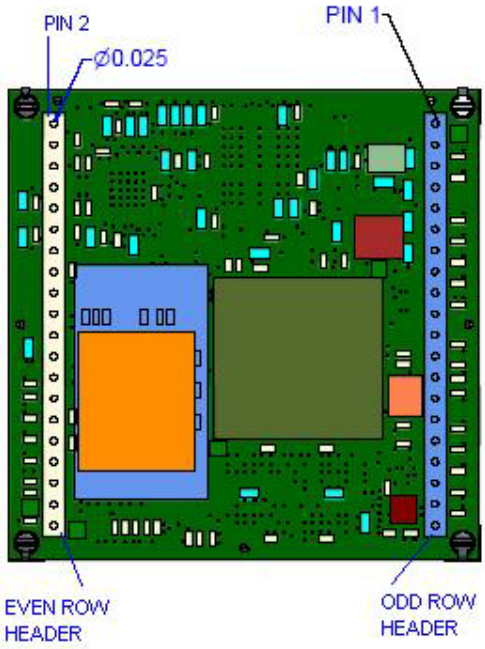


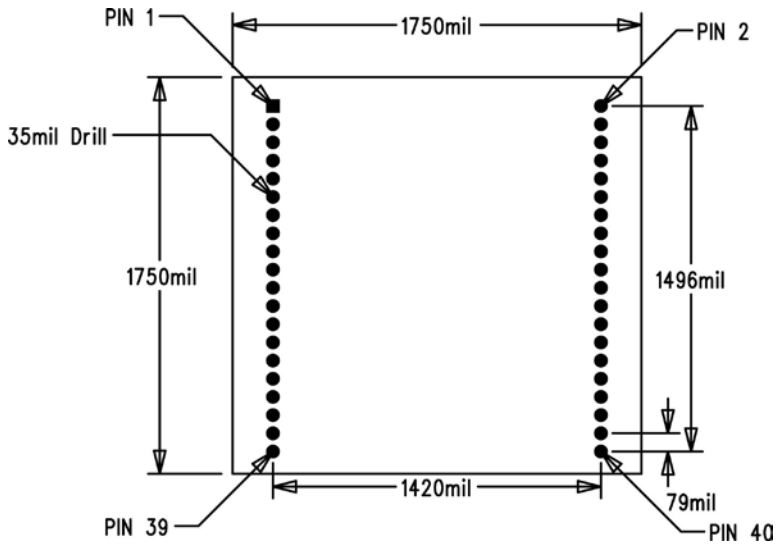
Figure 2-14. Bottom View



Recommended PCB Layout

The hole pattern and mounting dimensions for the MatchPort b/g Pro device server are shown in the following drawing:

Figure 2-15. PCB Layout (Top View)



Note: If a socket is used for product development purpose only, two 2-mm, 20-pin sockets spaced 1.42" apart can be used (e.g., Samtec P/N SMM-120-02-S-S-TR).

- To optimize noise and cross-talk reduction, noise immunity, and impedance matching on ETX+, ETX-, ERX+, ERX-, follow these guidelines when routing traces on the target PCB:
  - Route (ETX+, ETX-) pair as close to each other as possible, and far away from ERX+, ERX- and other signals
  - Route (ERX+, ERX-) pair as close to each other as possible, and far away from ETX+, ETX- and other signals
  - Set up PCB routing properties on each pair (ETX+, ETX-) and (ERX+, ERX-) to achieve 100-ohm impedance.
  - For EMI purposes, connect the metal housing (shield) of the RJ45 jack to Power Ground or Earth Ground and do not allow floating.

    If power ground and earth ground are to be separated, add ceramic capacitors in the range of 1000 pF to 0.1 uF in a stitching pattern between the two grounds to provide low impedance paths at high frequencies. The voltage rating on the ceramic capacitors should be much higher than the required isolation voltage between the two grounds.
- Connect 3.3V and ground on the MatchPort b/g Pro directly to 3.3V power and ground planes of the target board in place of heavy trace routing. This will minimize noises as well as voltage drops due to the trace.
- Make the RESETIN# trace on the target board as short as possible to avoid reset occurrences when transient voltages such as those caused by ESD are present.

Product Information Label

The product information label contains important information about your specific unit, such as its product ID (name), bar code, part number, and MAC address.

Figure 2-16. Product Label

3: Demonstration Kit

Using a MatchPort b/g Pro sample and the MatchPort Demonstration Kit, you can get familiar with the product and understand how to integrate the MatchPort b/g Pro into a given product design.

Contents of the Kit

The MatchPort Demonstration Kit contains the following items:

- MatchPort Demo Board
- 3.3V wall adaptor
- RS-232 cable, DB9F/F, null modem
- RJ45 Ethernet cable
- Antenna 2.15 dBi gain

You must obtain a MatchPort b/g Pro sample separately for use with this Demonstration Kit.

Note: *For developing custom application firmware on the MatchPort b/g Pro, Lantronix offers a MatchPort Plus Development board with a Background Debug Mode (BDM) connector together with a Software Development Kit (SDK). Please contact Lantronix for more details.*

Demo Board Description

The MatchPort Demo Board provides a test platform for the Lantronix MatchPort device server products, including MatchPort b/g Pro. The demo board uses 3.3V power from the wall adaptor same as that of MatchPort. The demo board has the following features

- 2 serial ports with RS232/RS422/RS485 Maxim MAX3160 transceivers. The ports have DB9M connectors.
- 1 RJ45 with integrated 1:1 magnetics for Ethernet connection; auto-MDIX compatible.
- Access to all signals on the MatchPort via header pins for measurements and connections to other places.

Serial Interfaces

The demo board has RS-232/422/485 transceivers, one per port. However, note that only Serial Port 1 supports RS232/RS422/485 on MatchPort b/g Pro. The table below lists the RS232 signals and corresponding pins on the demo board. All signals are level-shifted by the transceivers.

Table 3-1. RS-232 Signals on Serial Port 1

MatchPort Demo PIN FUNCTION	DB9 Pin #
Serial Port 1	**CON1**
TX1_232 (Data Out)	3
RX1_232 (Data In)	2
CTS1_232 (HW Flow Control Input)	8
RTS1_232 (HW Flow Control Output)	7
DCD1_232 (Modem Control Input)	1
DTR1_232 (Modem Control Output)	4
GND (Ground)	5

Table 3-x. RS-232 Signals on Serial Port 2

MatchPort Demo PIN FUNCTION	DB9 Pin #
Serial Port 2	**CON2**
TX2_232 (Data Out)	3
RX2_232(Data In)	2
CTS2_232 (HW Flow Control Input)	8
RTS2_232 (HW Flow Control Output)	7
DCD2_232 (Modem Control Input)	1
DTR2_232 (Modem Control Output)	4
GND (Ground)	5

Table 3-2. RS-422 4-Wire Connector on Serial Port 1

MatchPort Demo PIN FUNCTION	DB9 Pin #
Serial Port 1	**CON1**
TX+485 (Data Out)	7
TX-485 (Data Out)	3
RX+485 (Data In)	2
RX-485 (Data In)	8
GND (Ground)	5

Power Supply

The demo board uses an external 3.3V regulated supply (included with kit).

General Control

The following tables denote the jumper options of the demo board for use with the MatchPort b/g Pro.

Configuration Switch Bank

Table 3-3. Demo Board JP1 Jumper Configuration

JP1 pin/Signal	JP1 pin/Signal	Function
1/CP1	2/LED12	Jumper 1-2, CP1 Controls LED12
3/CP2	4/LED11	Jumper 3-4, CP2 Controls LED11
5/CP3	6/LED10	Jumper 5-6, CP3 Controls LED10
7/CP4	8/LED9	Jumper 7-8, CP4 Controls LED9
9/CP5	10/LED8	Jumper 9-10, CP5 Controls LED8
11/CP6	12/LED7	Jumper 11-12, CP6 Controls LED7
13/CP7	14/LED6	Jumper 13-14, CP7 Controls LED6

Table 3-4. Demo Board JP7 Jumper Configuration for CON1

JP7 pin/Signal	JP7 pin/Signal	Function
1/TXD1	2/TXA	Jumper 1-2, Send TXD to RS232/485 transceiver.
3/RTS1	4/RTSA	Jumper 3-4, Send RTS to RS232/485 transceiver. In 485 mode RTS controls transmit enable.
5/CP3	6/SEL4XXA	Jumper 5-6, CP3 high selects 485 mode, low 232 mode. Pin at transceiver is pulled down to default to 232 mode.
7/RXD1	8/RXA	Jumper 7-8, Receive RXD from RS232/485 transceiver.
9/CTS1	10/CTSA	Jumper 9-10, Receive CTS from RS232 transceiver.
11/CP4	12/HDPX4XXA	Jumper 11-12. In 485 mode, CP4 selects full duplex when low and half-duplex when high. Pin at transceiver is pulled down to default to full duplex.
13/CP1	14/DTRA	Jumper 13-14, CP1 drives DTR to RS232 transceiver.
15/CP2	16/DCDA	Jumper 15-16, CP2 receives DCD from RS232 transceiver.

Table 3-5. Demo Board JP8 Jumper Configuration for CON2

JP7 pin/Signal	JP7 pin/Signal	Function
1/TXD2	2/TXB	Jumper 1-2, Send TXD to RS232 transceiver.
3/RTS2	4/RTSB	Jumper 3-4, Send RTS to RS232 transceiver.
5/CP7	6/SEL4XXB	Do **not** add jumper since only RS232 is supported. Pin at transceiver is pulled down to default to 232 mode.
7/RXD2	8/RXB	Jumper 7-8, Receive RXD from RS232 transceiver.
9/CTS2	10/CTSB	Jumper 9-10, Receive CTS from RS232 transceiver.
11/RESERVED on MatchPort b/g Pro	12/HDPX4XXB	Do **not** add jumper since only RS232 is supported. Pin at transceiver is pulled down to default to 232 mode.
13/CP5	14/DTRB	Jumper 13-14, CP5 drives DTR to RS232 transceiver.
15/CP6	16/DCDB	Jumper 15-16, CP6 receives DCD from RS232 transceiver.

Table 3-6. Demo Board JP8 Jumper Configuration for CON2

JP7 pin/Signal	JP7 pin/Signal	Function
1/TXD2	2/TXB	Jumper 1-2, Send TXD to RS232 transceiver.
3/RTS2	4/RTSB	Jumper 3-4, Send RTS to RS232 transceiver.
5/CP7	6/SEL4XXB	Do **not** add jumper since only RS232 is supported. Pin at transceiver is pulled down to default to 232 mode.
7/RXD2	8/RXB	Jumper 7-8, Receive RXD from RS232 transceiver.
9/CTS2	10/CTSB	Jumper 9-10, Receive CTS from RS232 transceiver.
11/RESERVED on MatchPort	12/HDPX4XXB	Do **not** add jumper since only RS232 is supported. Pin at transceiver is pulled down to default to 232 mode.

JP7 pin/Signal	JP7 pin/Signal	Function
b/g Pro		
13/CP5	14/DTRB	Jumper 13-14, CP5 drives DTR to RS232 transceiver.
15/CP6	16/DCDB	Jumper 15-16, CP6 receives DCD from RS232 transceiver.

Note: *CP allocation in the tables above is the most straightforward for this specific board. However any CP can be assigned to any function. To reflect actual CP use in the eventual product (in case different), jumpers can be replaced with short wires to allow interchanging of connections.*

Table 3-7. Demo Board JP5 Jumper Configuration

Pin/Signal	Pin/Signal	Function
1/3V3	2/3V3_UUT	Jumper 1-2, MatchPort module power supply.

Note: Jumper can be replaced with short wire to allow use of a current clamp or <50 milliohm resistor to allow use of voltmeter for current measurements.

If using CPs for any combination of the demo board configurations above, please use the appropriate CP function selection as shown in Table 3-3 to Table 3-7.

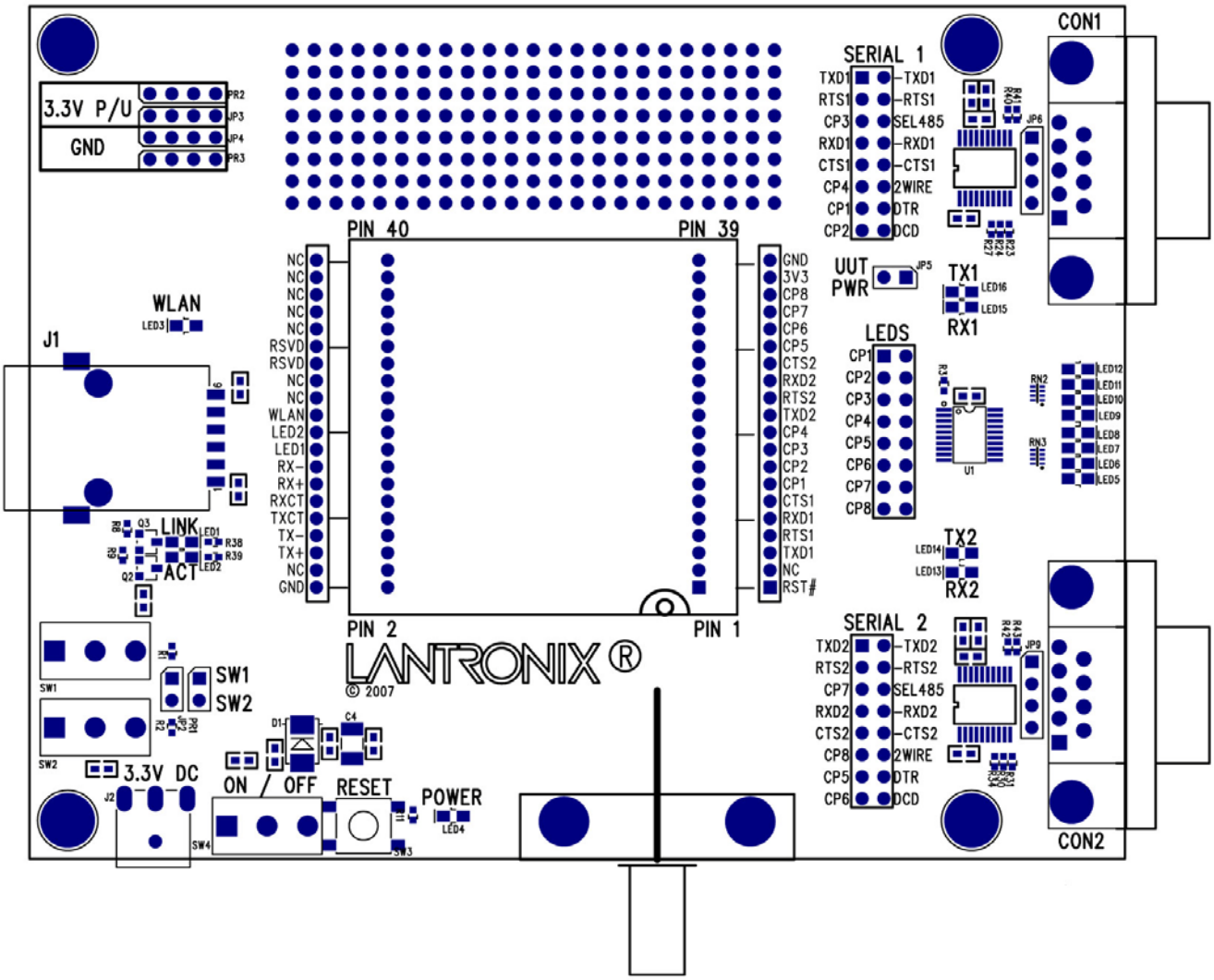
If assigning a CP for any function other than the serial port, remove the jumper for the associated CP pin from JP7 to avoid conflict with the serial port function.

Table 3-8. Demo Board Configurable Pin Jumper Configurations

Configurable Pin	JP1 Function	JP7,JP8 Function
CP1	LED12	JP7, CON1 DTR
CP2	LED11	JP7, CON1 DCD
CP3	LED10	JP7, CON1 RS485/232 Select
CP4	LED9	JP7, CON1 RS485 Duplex Select
CP5	LED8	JP8, CON2 DTR
CP6	LED7	JP8, CON2 DCD
CP7	LED6	JP8, leave open

Demo Board Layout

Figure 3-1. MatchPort Demo Board Layout



Demo Board Schematics

Figure 3-2. Demo Board Block Diagram

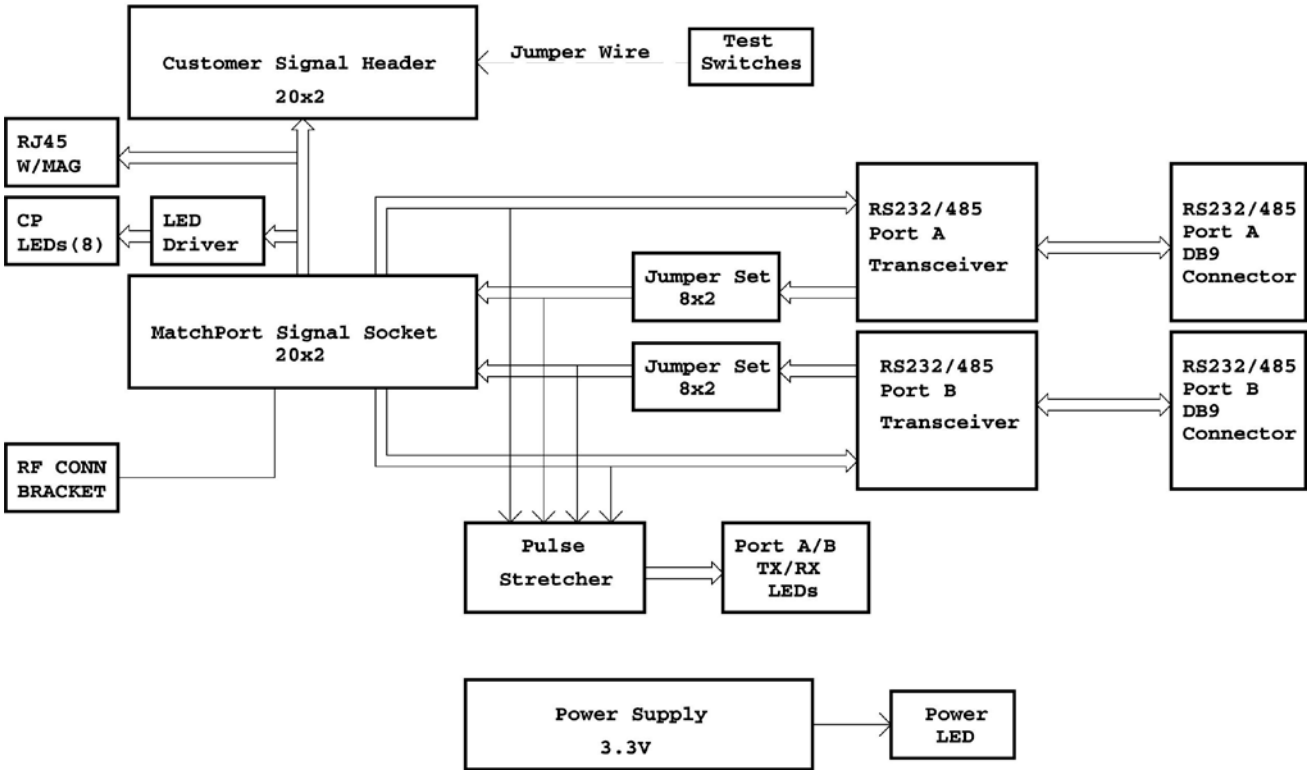


Figure 3-3. Schematic

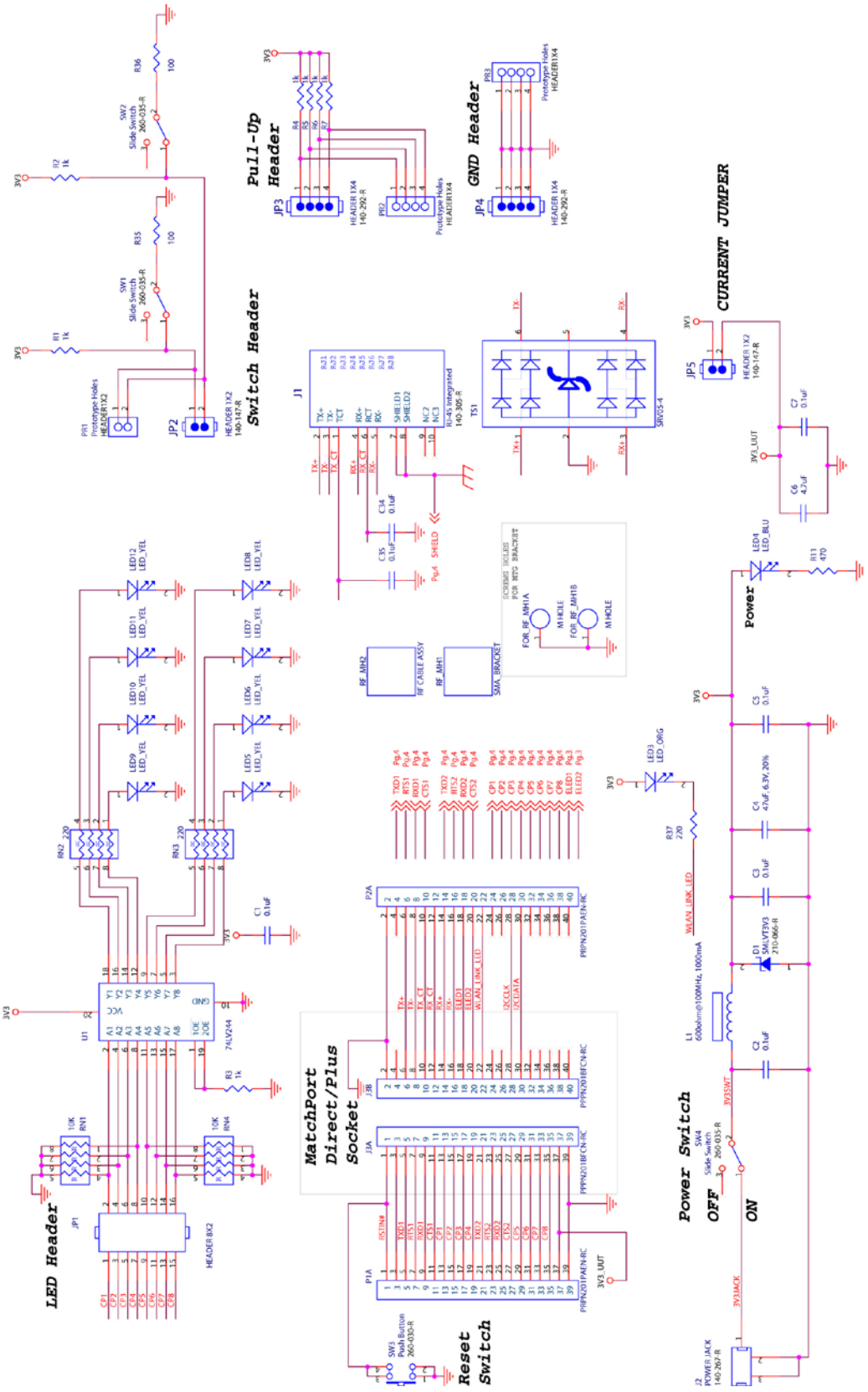


Figure 3-3. Schematic, continued

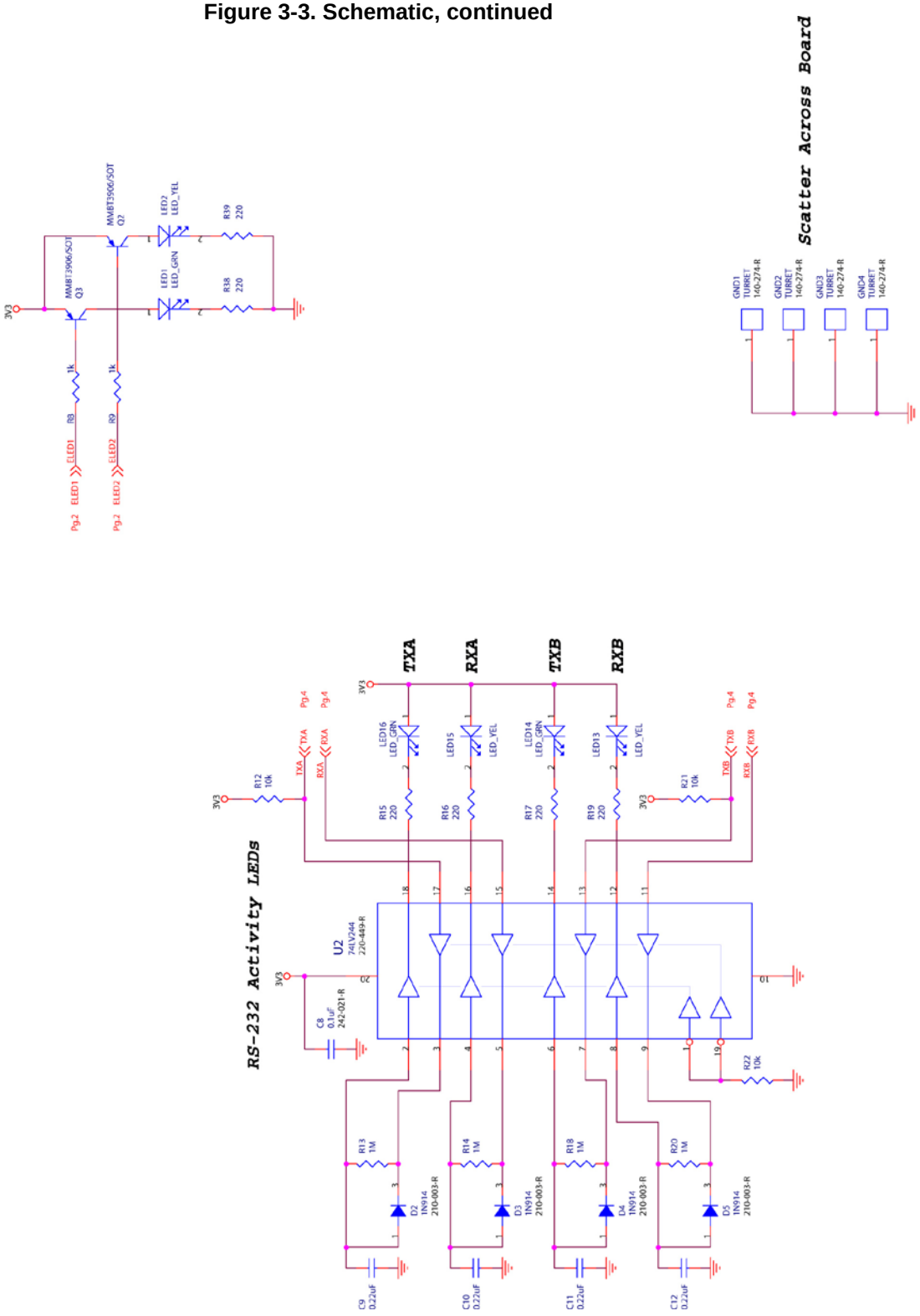
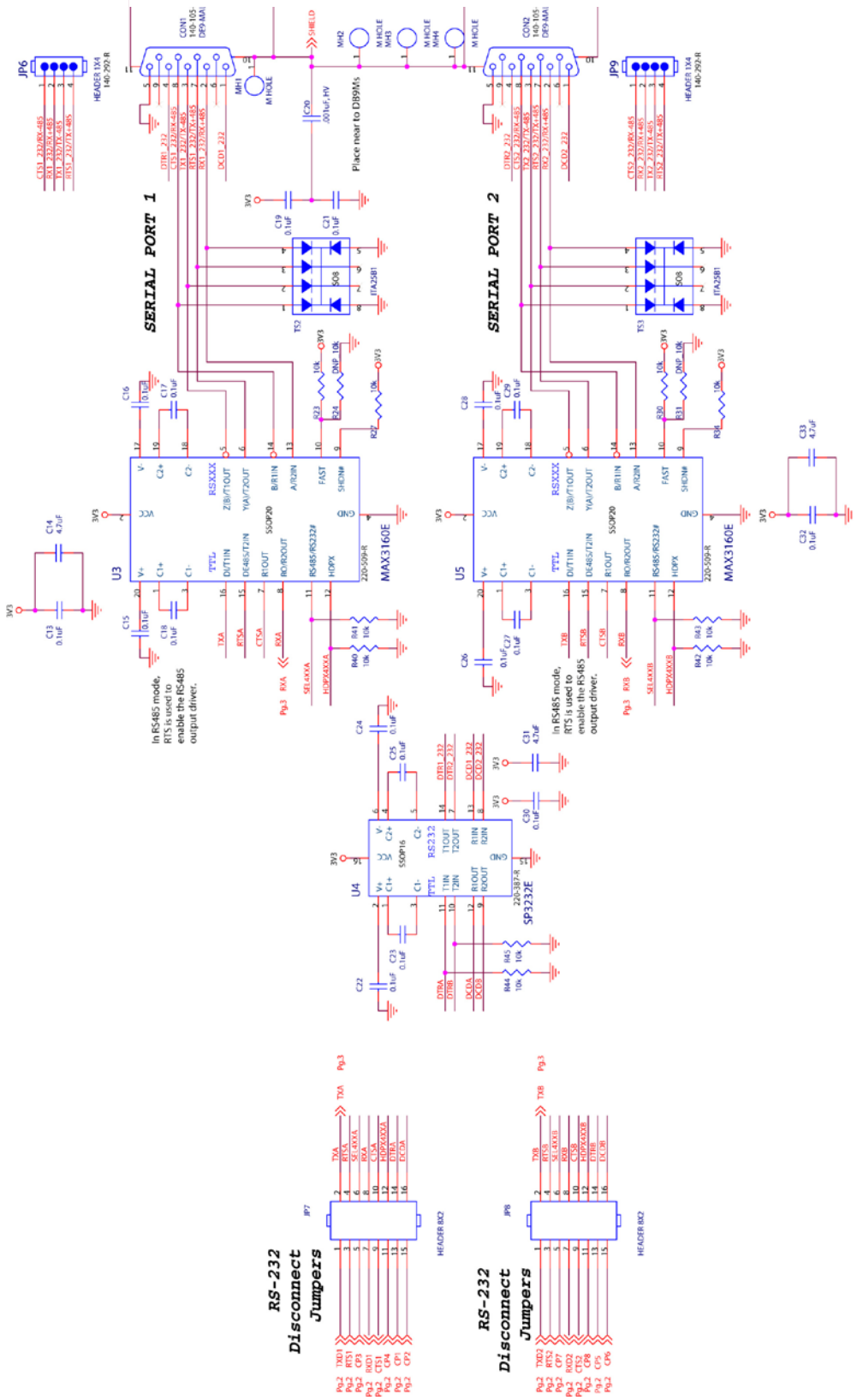


Figure 3-3. Schematic, continued



A: Compliance

(According to ISO/IEC Guide 17050-1, 17050-2 and EN 45014)

Manufacturer's Name & Address:

Lantronix 167 Technology Drive, Irvine, CA 92618 USA

Product Name Model: MatchPort b/g Pro Embedded Device Server

Conforms to the following standards or other normative documents:

Safety:

UL 60950-1

CAN/CSA-C22.2 No. 60950-1-03

EN 60950-1:2006, Low Voltage Directive (73/23/EEC)

EMC & Radio:

For purposes of certification, the MatchPort b/g pro was tested as a modular device.

CFR Title 47 FCC Part 15, Subpart B and C, Class B

FCC Module Approval

FCC Identifier: R68MPBGPRO

Industry Canada ICES-003 Issue 4 (2004), Class B

Industry Canada RSS-Gen Issue 2 (2007)

Industry Canada RSS-210 Issue 7 (2007)

Industry Canada Module Approval IC: 3867A-MPBGPRO

EN 301 489-1 v1.6.1 (2006-07), EMC Directive (1999/5/EC)

EN 301 489-17 v.1.2.1 (2002-08), EMC Directive (1999/5/EC)

EN 300 328 v1.7.1 (2006-10), R&TTE Directive (1999/5/EC)

Australia / New Zealand AS/NZS CISPR 22 (2006), Class B

Australia / New Zealand AS/NZS 4771 (2000 + A1:2003)

EN55022: 2006

EN55024: 1998 + A1: 2001 + A2: 2003

EN61000-3-2: 2006

EN61000-3-3: 1995 + A1: 2001

Manufacturer's Contact:

Director of Quality Assurance, Lantronix
167 Technology Drive, Irvine, CA 92618 USA
Tel: 949-453-3990
Fax: 949-450-7249

B: Warranty

For details on the Lantronix warranty replacement policy, go to our web site at www.lantronix.com/support/warranty